


**IN UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF ALASKA AT ANCHORAGE**

Case No. A04-49 CV (JWS)

**Enoch Adams et al.
v.
Teck Cominco Alaska Incorporated**

Supplemental Report of

A handwritten signature in cursive script, reading "Robert H. Fuhrman", is written over a horizontal line.

Robert H. Fuhrman

Principal

**Seneca Economics and Environment, LLC
15701 Seneca Road
Germantown, MD 20874**

January 17, 2008

**SUPPLEMENTAL ANALYSIS OF ECONOMIC BENEFIT
IN
ADAMS ET AL. v. TECK COMINCO ALASKA INCORPORATED**

Robert H. Fuhrman¹
January 17, 2008

I. INTRODUCTION

The purpose of this Supplemental Report is to update the analysis provided in my expert report of November 12, 2004 and to include additional amounts of economic benefit due to noncompliance identified since that report, all of which relate to alleged exceedances of Teck Cominco Alaska Incorporated's ("TCAK" 's) NPDES permit limitations in the 2003 through June 2007 time period.

On July 6, 2004, the Plaintiffs in *Enoch Adams et al. v. Teck Cominco Alaska Incorporated* issued a Revised Complaint for Injunctive and Declaratory Relief and Civil Penalties. For various pollutants, the Revised Complaint covered discharge seasons beginning in 1999 and going through specified dates in 2002 and 2003.²

On August 31, 2007, the Plaintiffs filed a Motion for Leave to File Supplemental Complaint, which the court granted. For various pollutants, that Supplemental Complaint covered discharge seasons 2003 through 2006 and June 2007.

Since my previous report addressed the economic benefit TCAK obtained due to the alleged violations in the earlier period, this Supplemental Report covers the various alleged exceedances for the more recent period.

At the request of Counsel for TCAK, I reviewed the supplemental list of alleged violations with Robert Napier and Joseph Diehl, Environmental Coordinators employed by TCAK's Red Dog Mine, which is the focus of this report. In my discussions with Mr. Napier and Mr. Diehl, I attempted to determine whether any of the alleged violations resulted from delayed and/or avoided pollution control expenditures that should have been incurred at earlier points in time. For additional context, I also reviewed documents provided by Counsel for TCAK related to various regulatory developments.

¹ My updated Rule 26(a)(2)(B) disclosures appear in Appendix 1 of this report.

² For example, for TDS the Revised Complaint alleged exceedances ending on August 14, 2003. For cyanide, the last alleged exceedance was on September 20, 2002. For whole effluent toxicity, the last one was in October 2002. For the last cited dates related to the Fourth to Tenth Claims in that document, see pages 19 through 27 of the Revised Complaint for Injunctive and Declaratory Relief and Civil Penalties (2004).

II. FINDINGS

A. Alleged Violations of Total Dissolved Solids Permit Limitations

Plaintiffs identified various days between the start of the water discharge season in 2004 and June 30, 2007 during which they believe the Red Dog Mine exceeded its daily maximum discharge limit for total dissolved solids (TDS). However, based on Mr. Napier's review of TCAK documents, he concluded that TCAK did not discharge on the following days cited by the Plaintiffs:

2004: June 13; August 12-14, 19-20; September 7, 10-13, and 15-17.
 2005: August 5.
 2007: May 31 and June 1.

TCAK admits that during this time period analytical results for TDS reported in the Red Dog Mine's discharge monthly reports (DMRs) show that it exceeded the daily and monthly average limitations contained in its modified 2003 NPDES permit on numerous days.

Mr. Napier provided the following information related to TCAK's compliance with interim limits imposed by EPA and the State of Alaska related to daily TDS limits during the relevant time period:

- With the two exceptions noted below, TCAK's discharges in 2004 were in accordance with EPA Compliance Order by Consent (COBC) dated May 7, 2004, Docket No. CWA-10-2004-0141. Interim TDS limits of 500 at Station 10 during Grayling spawning, and afterwards at 1,500 milligrams per liter (mg/l), were in effect, as was a daily limitation of 3,900 mg/l at Outfall 001. TDS excursions at Outfall 001 occurred on August 31, 2004 and September 22, 2004, and were reported in the Red Dog Mine's DMRs.
- TCAK's discharges in 2005 were in accordance with EPA COBC, Docket No. 07-0289-50-6314. Interim TDS limits in effect were 500 mg/l at Station 151 during Grayling spawning and afterwards at 1,500 mg/l at 151 and 3,900 at Outfall 001 or 110 percent mass balance of highest TDS to date.
- TCAK's discharges in 2006 were in accordance with EPA COBC, Docket No. CWA-10-2006-0263. Interim TDS limits in effect were 1,500 mg/l at Station 151 throughout the discharge season, and mass balance using TDS concentration of 110 percent of the highest TDS at Outfall 001 to date.
- EPA issued a new NPDES permit for the Red Dog Mine in March 2007, which set in-stream TDS limits of 1,500 mg/l at Station 151, 1,000 mg/l at Station 150, and 500 mg/l at Station 160 and no numeric TDS limit at Outfall 001. In September 2007, the permit was withdrawn due to EPA's decision to require that

a Supplemental Environmental Impact Study be prepared and evaluated by EPA related to a proposed expansion of mining activity at the Red Dog Mine.

- The Red Dog Mine's discharges in 2007 was under the authority of ADEC COBC 07-0289-50-6314 and an EPA letter signed by Michael F. Gearhard, Director, Office of Water and Watersheds, EPA Region X "encouraging" TCAK to minimize impacts by ensuring discharges do not cause in-stream excursions above water quality criteria (1500 mg/l at 151). TDS at Outfall 001 exceeded 3,900 mg/l on June 26. TCAK submitted a written report to EPA that stated that it expected to exceed the 3,900mg/l limit through the remainder of the 2007 discharge season.

In the Plaintiffs' Supplemental Complaint (August 31, 2007), they identified multiple days on which they believe TCAK's discharges exceeded the monthly average limitation for TDS (170 mg/l) in its 2003 NPDES permit. However, according to Mr. Napier, on three of the listed days, there were no discharges from Outfall 001: June 13, 2004; and May 31 and June 1, 2007. Additionally, he stated that the above-TDS-permit-limit monthly averages were authorized by the COBCs referenced above.

As the Plaintiffs have noted, COBCs do not modify the terms of the underlying NPDES permit limits. Instead, they extend the deadlines by which TCAK must comply with its permit limitations. Stated differently, they do not provide an absolute shield against enforcement.

Relevant Regulatory Developments

- According to the Alaska Administrative Code, 18 AAC 70.236, the State of Alaska, in its discretion, can establish a site-specific water quality criterion that modifies a water quality criterion set out in 18 AAC 70.020(b).³
- The Red Dog Mine's modified 2003 NPDES permit included a TDS limitation of 500 mg/l for Stations downstream of Outfall 001 during the grayling spawning season.
- On June 11, 2003, the Alaska Department of Environmental Conservation (ADEC) submitted two site-specific criteria (SSC) for TDS for the Red Dog Creek: 500 mg/l during the Arctic grayling spawning season and 1,500 mg/l for the rest of the year when grayling are not spawning. EPA's approval of these two SSCs was appealed by the Plaintiffs.⁴
- On July 17, 2003, as part of its proceedings on remand from the Environmental Appeals Board, EPA issued a 308 Information Request that required TCAK to

³ By definition, a state site-specific criterion is protective of the environment.

⁴ The SSC for the non-grayling spawning season was approved on July 16, 2003 and later upheld by the EPA Environmental Appeals Board (EAB). The EAB remanded the proposed SSC for the grayling spawning season to EPA Region X for further consideration.

conduct tests to determine the effects of the Red Dog Mine's effluent on the spawning success of the grayling. TCAK conducted such tests in 2004 and 2005 and submitted the results to ADEC.

- On February 2, 2006, ADEC submitted a new SSC for the grayling spawning season for TDS in the Main Stem Red Dog Creek: 1,500 mg/l.
- On April 21, 2006, EPA approved the 1,500 mg/l in-stream limit for TDS for the grayling spawning season.

Discussion

According to Robert Napier, based on TCAK's sampling results, there were no TDS excursions above 1,500 mg/l in the Main Stem Red Dog Creek during the discharge seasons of 2004-2006 or during June 2007.

If the necessary studies and legal fees related to the two SSCs had been incurred prior to one year before the issuance of the August 1998 permit, the TDS limits in that permit presumably would have been set at 1,500 mg/l, including the period of the grayling spawning season. They were set at that level in the now-withdrawn 2007 NPDES permit, which was issued after the two SSCs for TDS were approved.

In my November 12, 2004 report, I calculated the economic benefit associated with TDS noncompliance by analyzing certain actual costs as "delayed" costs that should have been incurred prior to the issuance of the August 1998 NPDES permit. According to Counsel, if those costs had been incurred "on-time," the limitations in the resulting August 1998 permit would have been significantly less stringent than the actual limitations approved by EPA in 1998 NPDES permit.

According to earlier discussions with Mark Thompson, formerly an Environmental Coordinator at the Red Dog Mine, and more recent discussions with Robert Napier, with the higher limitations, no TDS violations would have occurred.

Incurring the costs "on time" to bring about the SSCs and changed permit limits in a timely manner instead of later in time (the "delay" case in the context of an economic benefit analysis) would have been the least cost means of compliance with environmental requirements.

In this Supplemental Report, I make similar calculations to those in my November 12, 2004 report, this time related to the costs necessary for obtaining the SSC for the grayling spawning season in a timely manner. Based on discussions with Counsel and TCAK, it is logical that these expenditures should have been incurred one year prior to July 29,

1998,⁵ which is when EPA approved TCAK's NPDES permit that became effective on August 22, 2003.⁶

The economic benefit analysis presented in Appendix 2 extends the penalty payment date considered in my earlier report to August 1, 2008, which is shortly after the anticipated close of the trial in this case.

The analysis also includes the additional assumptions discussed on the previous page related to the SSC for the grayling spawning season and reimbursements paid by TCAK to the State of Alaska for work performed by the Office of Habitat Management and Permitting, State of Alaska Department of Management Resources related to this SSC. The economic benefit resulting from not incurring these costs prior to July 29, 1997 totals \$20,995 as of August 1, 2008.

B. Alleged Violations of Cyanide Permit Violations

In their Supplemental Complaint, Plaintiffs alleged that TCAK's discharges resulted in exceedances of its applicable NPDES permit limitations related to cyanide. The daily maximum discharge limit was 9 parts per billion (ppb), and the maximum monthly average limit was 4 ppb.

According to the Supplemental Complaint, TCAK allegedly violated the daily maximum limit for cyanide on the following dates: May 10 and 13, 2003; June 17 and 24, 2003; July 1, 15, 21, and 29, 2003; August 12, 2003; May 23, 2005; August 9, 2005; September 5, 12, and 19, 2005; October 3, 2005; May 11 and 15, 2006; June 5, 2006; and October 1, 2006.

Also, according to Plaintiffs, TCAK allegedly also exceeded its monthly average limitation for cyanide in September 2005, October 2005, May 2006, June 2006, July 2006, August 2006, and September 2006.

Mr. Napier reviewed with me the sampling results for cyanide related to these alleged exceedances. I have chosen not to discuss here the details of that discussion, which are very technical in nature and relate to the evaluation of split samples between two laboratories, with each lab performing two different tests for cyanide and with each sample further divided to perform the testing with "the sulfide field fixed" and "sulfide field not fixed." We also discussed what results would have been if the samples were averaged for each split sample provided to each of the labs for each day. (For the most part, all alleged violations would have disappeared if samples were averaged.) Based on the "weak acid dissociable" (WAD) test, all of the alleged violations would arguably disappear.

⁵ This assumption recognizes that the environmental regulatory agencies would require sufficient lead time for decision making. Thus, these expenses should have been incurred by July 29, 1997.

⁶ The modeling follows the same sequence in the "on time" case as in the "delay" (or actual world) case.

Furthermore, WAD cyanide and split sample averaging matters notwithstanding, Section I.A.5.d of the 1998 permit (and its 2003 modification) states that “effluent limits for cyanide are not quantifiable using EPA approved analytical methods.” The Interim Minimum Level for Cyanide for compliance evaluation is 9 ug/L. With the exception of the September 2005 monthly average violation (which TCAK contended to be a non-exceedance), all DMR table results were reported as <9 ug/L for both the average and maximum columns. The compliance level for cyanide is 9 ug/L for both the daily maximum and monthly average.

Relevant Regulatory Developments

As discussed in my November 12, 2004 report, the 1998 NPDES permit⁷ for TCAK required that compliance be demonstrated based on the “total cyanide analytical method,” which measures the amount of both free cyanide and non-bio-available cyanide compounds. In 2003, the State of Alaska decided to rely solely on the WAD test for measuring compliance with the aquatic life standard, the standard on which TCAK’s NPDES permit is based.⁸

According to Robert K. Reges, Esq., of counsel to Hartig Rhodes Hoge & Lekisch PC, by 2005, EPA had approved use of WAD cyanide analyses.

Discussion

The State of Alaska’s decision to rely solely on the WAD test for determining compliance, EPA’s approval of this change in the State water quality standard, and EPA’s future issuance of an NPDES permit based solely on the WAD test, are all beyond TCAK’s control.

Based on the above discussion, I do not believe that any economic benefit should be attributed to the alleged cyanide violations.

C. Alleged Violations of Whole Effluent Toxicity Limitations

According to the Supplemental Complaint, TCAK exceeded the maximum daily limit for Whole Effluent Toxicity (WET) in August 2004.

TCAK’s August 3, 2004 Ceriodaphnia dubia (“C. dubia”) bioassays were performed by two different consulting firms, ENSR and CH2M Hill. According to the C. dubia test results performed by ENSR on that day, the effluent passed the C. dubia test. However, according to the C. dubia test results performed by CH2M Hill on a sample taken that day, the effluent failed the test. In any case, based on TCAK’s Pimephales promelas bioassays, it passed the test.

⁷ According to attorney Robert K. Reges, the 2003 NPDES permit modification did not revise cyanide limits in any manner. This is because EPA anticipated addressing all topics other than TDS in a new NPDES permit that it expected to issue no later than 2005.

⁸ Expert Report of Robert H. Fuhrman, November 12, 2004, page 13.

Mr. Napier told me that the CH2M Hill test results on August 3, 2004 indicated an irregular result in the 11 percent effluent concentration in the first aliquot. He said that this type of variability is inherent to the methodology that was used.

TCAK's Petition for Review of certain of its renewed NPDES permit limits (a petition to the EPA Environmental Appeals Board dated April 11, 2007), noted, "EPA predicts that WET tests will be wrong five to twenty percent of the time. Edison Elec. Institute v. E.P.A., F.3d 1267, 1272 (C.A.D.C. 2004)."⁹ The August 3, 2004 test result by CH2M Hill may also be due to the inherent variability that characterizes WET testing results.

In light of all of the above information, it is debatable whether a true exceedance occurred on August 3, 2004 or whether the failed test was simply an anomaly. This is particularly true because the samples for the Pimephales promelas bioassays indicated compliance.

In any case, I have been unable to identify any costs that TCAK should have incurred that would have enabled it to achieve compliance on August 3, 2004.

III. ECONOMIC BENEFIT RESULTS

As shown on Table 1, based on the information discussed in my November 12, 2004 report and in this Supplemental Report, I calculated that TCAK obtained an economic benefit of \$124,942 due to noncompliance, assuming a penalty payment date of August 1, 2008. The supporting calculations appear in Appendix 2 to this report.

⁹ Attorneys for TCAK, Permittee's Petition for Review before the Environmental Appeals Board, United States Environmental Protection Agency, April 11, 2007.

Table 1
Summary of Economic Benefit Results

Claim Number	Claim Description	Starting Item Number	Ending Item Number	Value of On-Time Case at PPD*	Value of Delay Case at PPD*	Economic Benefit at PPD*
1	Mine Site: Violations of Total Dissolved Solids Permit Limits	1 86	48 89	510,297	465,485	44,812
2	Mine Site: Violations of Cyanide Permit Limits	N/A	N/A	N/A	N/A	N/A
3	Mine Site: Whole Effluent Toxicity ("WET") Testing Permit Violations	49	49	22,487	-	22,487
4	Mine Site: Cadmium Permit Limit Violations	50	50	78	-	78
5	Mine Site: Unpermitted Discharges to the Tundra	51	53	8,706	2,219	6,488
6	Mine Site: Self-Monitoring and Reporting Violations	54	57	56,701	45,072	11,629
7	Port Site: Unpermitted Discharges	58	58	1,098	-	1,098
8	Port Site: Total Suspended Solids Permit Limit Violations	59	67	109,877	74,235	35,642
9	Port Site: Self-Monitoring and Reporting Violations	68	71	42,073	39,851	2,222
10	Mine Site: Violations of Consent Order	72	85	18,225	17,739	486
Total				769,542	644,600	124,942

*PPD - Penalty Payment Date is assumed to be August 1, 2008.

IV. SOURCES CONSIDERED AND RELIED UPON

In developing this report, I reviewed the following documents not specifically identified in my November 12, 2004 report or discussed above:

- EPA, BEN model version 4.3.
- Plaintiffs' Memorandum of Points & Authorities in Support of Motion for Leave to File Supplemental Complaint, August 31, 2007.
- Plaintiffs' [Proposed] Supplemental Revised Complaint for Injunctive and Declaratory Relief and Civil Penalties, October 8, 2007.
- Letter from Luke Boles, Environmental Engineering Associate, Wastewater Discharge Program, State of Alaska Department Environmental Conservation, to Mike Lidgard, NPDES Unit Manager, U.S. EPA, Seattle, Washington dated January 20, 2006. Attached to that letter were fifteen pages under the heading "Appendix A: Cadmium Natural Condition Based Site Specific Criterion," which appears to be a Draft 401 certification of NPDES Permit AK-003865-2 for the Red Dog Mine.
- Letter from Sharmon Stambaugh, Wastewater Discharge Program Manager, State of Alaska Department of Environmental Conservation to John Knapp, General Manager, Cominco Alaska, Inc. dated February 12, 2007. Attached to that letter is a State of Alaska Department of Environment Conservation Certificate of Reasonable Assurance dated February 12, 2007.
- TCAK, Permittee's Petition for Review before the Environmental Appeals Board, United States Environmental Protection Agency, April 11, 2007.
- Alaska Administrative Code - 18 AAC 70.236.
- Letter from Robert F. McLean, Area Manager, Office of Habitat Management and Permitting, State of Alaska Department of Natural Resources addressed to Jim Kulas, Environmental Manager, TCAK, dated October 20, 2004.
- An August 17, 2005 letter from Robert F. "Mac" McLean, Area Manager, Office of Habitat Management and Permitting, State of Alaska Department of Natural Resources to Pete McGee, Alaska Department of Conservation re: total dissolved solids, Mainstem Red Dog Creek, Arctic Grayling.
- E-mail from Robert F. McLean, State of Alaska Department of Natural Resources, to Robert Napier, Environmental Coordinator, TCAK, January 17, 2008.

- Letter dated January 30, 2006 from Lynn J. Tomich Kent, Director, Division of Water, State of Alaska Department of Environmental Conservation to Michael F. Gearhard, Director, Office of Water and Watersheds, U.S. EPA, Seattle, Washington re: site-specific criterion for total dissolved solids in the Red Dog Creek, Alaska. There were four attachments to the letter:
 - A copy of the final regulation in 18 AAC 70.236(b)(5).
 - Order Adopting Changes to Regulations of the Department of Environmental Conservation dated January 12, 2006 and signed by Kurt Fredriksson, Commissioner of ADEC
 - January 13, 2006 memorandum from Steven C. Weaver, Assistant Attorney General, Legislation/Regulation Section - Juneau to Hon. Kurt Fredriksson, Commissioner of ADEC
 - Alaska Department of Environmental Conservation Decision Document for a Total Dissolved Solids Site-Specific Criterion for Red Dog Creek.
- An April 21, 2006 letter from Michael F. Gearhard, Director, Office of Water and Watersheds, EPA Region X to Lynn J. Tomich Kent, Director, Division of Water, ADEC re: EPA Review of the Main Stem Red Dog Creek Site-Specific Criterion for Total Dissolved Solids for the Arctic Grayling Spawning Period.
- Red Dog Mine Use Attainability Analysis performed for the Red Dog Creek, March 2006.
- TCAK, Responses to Kivalina Residents' August 31, 2007 Memorandum of Points & Authorities in Support of Leave to File Supplemental Complaint, Case No. A04-49 (JWS).

Appendix 1

STATEMENT OF ROBERT H. FUHRMAN

I, Robert H. Fuhrman, affirm and state:

1. My professional qualifications are set forth in my CV, which is attached to this statement.
2. A list of my publications in the last ten years is set forth in my resume, which is attached to this statement.
3. My testimony at trial and by deposition within the past four years is set forth in a chart, which is attached to this statement.
4. Seneca Economics and Environment, LLC's rate of compensation from defendant's counsel for my services in this case, which was \$375 per hour in 2004, has been \$400 per hour since at least October 2007.
5. My opinions are set forth in my expert report dated November 12, 2004, my rebuttal report dated January 23, 2004, and my supplemental report dated January 17, 2008.

Robert H. Fuhrman
Robert H. Fuhrman

Jan. 17, 2008
Date

ROBERT H. FUHRMAN
Seneca Economics and Environment, LLC

Mr. Fuhrman has worked as a consultant for over twenty years, specializing in economic, financial, and regulatory policy analysis. His diverse background as a government economist, trade association executive, and consultant, as well as his training in economics, political science, and business administration, have given him a broad background in both public and private sector issues. He has worked in many engagements as a testifying expert witness, has extensive negotiation experience, and has authored over thirty published articles. In the environmental arena, Mr. Fuhrman has worked on cases involving civil penalties, ability-to-pay determinations, and monetary valuations of mitigation projects; Superfund cost recovery; hazardous waste insurance; and commercial litigation. In other consulting engagements, he has worked on matters related to municipal financial capability; tort damages; and breach-of-contract cases.

Mr. Fuhrman's background also includes seven years of experience as an economist at the U.S. Environmental Protection Agency (EPA), three years at the Pharmaceutical Manufacturers Association (PMA), two years at General Electric's Center for Advanced Studies, and several years as an independent consultant.

He founded Seneca Economics and Environment, LLC, in January 2002, and has been a principal of that firm since that time.

From 1997 to 2001, Mr. Fuhrman was a principal and director of *The Brattle Group, Inc.*, an economic, environmental, and management consulting firm. Before that time, he was a principal and director of Putnam, Hayes & Bartlett, Inc., a consulting firm he joined in 1987. From 1983 to 1986, he served as Director of Finance and Administration at PMA (now known as the Pharmaceutical Research and Manufacturers Association). In that capacity, he managed the business and financial affairs of that trade association.

While at EPA from 1977 to 1983, Mr. Fuhrman served as an economist on the Energy Policy Staff, as Acting Chief of the Industrial Analysis Branch of the Economic Analysis Division, as Acting Director of that Division, and as Special Assistant to the Deputy Administrator (on an approximately one-year detail). During his tenure as Acting Chief of the Industrial Analysis Branch, he directed a staff that analyzed the environmental, economic, and financial effects of existing and potential EPA regulations affecting major industries, including chemicals, petroleum refining, iron and steel, copper and aluminum smelting. When he was Acting Director of EPA's Economic Analysis Division in the Agency's central policy office, he directed and coordinated the efforts of approximately 40 economic analysts in their evaluation of the economic and financial effects of the Agency's policies. As a Special Assistant to the EPA Deputy Administrator, Mr. Fuhrman analyzed conflicts between national energy and environmental policies, and provided advice on subjects such as the regulation of air emissions from coal-fired power plants.

From 1975 to 1976, Mr. Fuhrman was a staff associate at Developing World Industry and Technology, Inc., where he wrote case studies on corporate transfers of U.S. unique technologies to non-affiliated foreign firms, analyzing their implications for the U.S. economy. While at General Electric's Center for

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Advanced Studies from 1973 to 1975, Mr. Fuhrman performed classified studies for the Office of the Secretary of Defense. He also has worked as an independent consultant to such organizations as the Federal Energy Administration, the United Nations Environment Program, and the Center for Clean Air Policy.

Mr. Fuhrman received a B.A. from Columbia College, where he studied economics and political science, and an M.B.A. from Harvard Business School.

REPRESENTATIVE CONSULTING EXPERIENCE

Mr. Fuhrman has participated in numerous studies for public and private clients.

- He is currently working on economic benefit analyses and related types of analyses for several clients.
- For over 150 private-sector clients and for one public interest group, he has analyzed public and private entities' economic savings due to alleged noncompliance with environmental laws. For many entities, he also calculated their ability to pay civil penalties. Due to these engagements, Mr. Fuhrman has developed a high level of expertise on EPA enforcement matters, including EPA's media-specific civil penalty settlement policies and various computer models used by the Agency in calculating the economic benefit of noncompliance, entities' ability-to-pay penalties, and the value of supplemental environmental projects (*i.e.*, the BEN, ABEL, and PROJECT models). These cases have involved firms in many different industries, including metals, chemicals, pulp and paper, oil and gas, and diversified manufacturing. Together with counsel, Mr. Fuhrman has participated in settlement negotiations on behalf of many of these clients with EPA, the U.S. Department of Justice, state and local regulatory authorities, and environmental groups.
- In July 2007, on behalf of the American Chemistry Council and the Corporate Environmental Enforcement Council, Mr. Fuhrman drafted comments for the EPA public docket on "Enhancing Environmental Outcomes from Audit Policy Disclosures through Tailored Incentives for New Owners."
- In July 2004, on behalf of the Manufacturers Ad Hoc Group (comprised of the Alliance of Automobile Manufacturers, the American Chemistry Council, the Corporate Environmental Enforcement Council, the National Association of Manufacturers, and the National Ready Mixed Concrete Association), Mr. Fuhrman drafted the "Comments of the Manufacturers Ad Hoc Group" that were submitted to the U.S. EPA Science Advisory Board's Illegal Competitive Advantage Economic Benefit Advisory Panel.
- In 1999, on behalf of ten trade associations that comprised the "Ad Hoc Group," Mr. Fuhrman co-authored comments with Paul Wallach, Esq. (now deceased), of Hale and Dorr, LLP, that

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were submitted to EPA concerning “wrongful profits” and “illegal competitive advantages” that EPA associated with environmental noncompliance in a Federal Register notice appearing at 64 Fed. Reg. 32,948.

- In 1997, on behalf of the 12 trade associations and organizations that comprised the “BEN Coalition,” Mr. Fuhrman co-authored comments that were submitted to EPA concerning its economic benefit recovery program.
- In 1995, for the American Automobile Manufacturers Association, American Forest and Paper Association, Chamber of Commerce of the United States, Chemical Manufacturers Association, and the National Association of Manufacturers, Mr. Fuhrman analyzed theoretical and practical problems with EPA’s computerized software (the “BEN Model”) for analyzing companies’ economic savings due to noncompliance. As part of this activity, he met with senior officials of EPA’s Office of Enforcement and the U.S. Department of Justice to present his analysis of the model’s analytic shortcomings.
- He calculated a county’s ability to pay a portion of the cost of cleaning up a Superfund site in Indiana.
- As part of a team involving multiple consultants, he helped to develop damage estimates in coal contract litigation between a major manufacturer of steel and its chief supplier of metallurgical coal.
- He calculated damages in a case in which fraudulent nondisclosure of environmental liabilities in the sale of a business entity was a major issue.
- Due to litigation related to an insurance claim, Mr. Fuhrman reviewed extensive cost documentation regarding the environmental cleanup associated with a fertilizer warehouse fire and opined on which costs might be recoverable in litigation.
- For American University, he helped develop a monetary claim concerning damages resulting from the disposal of mustard gas and related chemical substances on the university’s campus during World War I by the U.S. Army.
- He worked on a large breach-of-contract case involving the U.S. Department of Energy’s failure to remove spent nuclear fuel from three utility generating stations. Mr. Fuhrman’s work on this matter was to coordinate the efforts of two teams of consultants to develop a complex methodology that simulated utilities’ cash flows and modeled actual and “but-for” worlds for use in damage calculations.

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- Mr. Fuhrman helped to evaluate potential Superfund liabilities of several Fortune 500 companies. This work was performed in the context of hazardous waste-related insurance coverage cases and involved probabilistic cost forecasting within the analytic structure of decision analysis.
- He worked on the prudence of past hazardous waste disposal activities. In several of these cases, Mr. Fuhrman reviewed key aspects of federal legislation and regulations related to specific toxic substances (*e.g.*, PCBs, organic solvents, metal plating wastes, and waste oil) from 1899 through the mid-1980s. He also analyzed industrial use and disposal practices related to some of these wastes for the period 1950 through 1985, and evaluated changing public perceptions of environmental hazards from the 1940s through the mid-1980s.
- In a Superfund cost recovery case, Mr. Fuhrman performed a detailed analysis of a county's ability to pay its *pro rata* share of the cleanup costs at a multi-party site. As part of this analysis, he reviewed financial data provided by the county and state government, including both historical data and budgetary projections, and information generated by credit rating agencies. He examined general fund balances and determined the county's ability to raise revenues through tax increases and additional debt financing over a ten-year time frame. He also assessed indications of financial distress by performing ratio analyses and by considering population trends and other indicators.
- On behalf of plaintiffs in a class action law suit involving tens of thousands of illegally conducted strip searches, Mr. Fuhrman completed an expert report assessing the Orleans Parish (Louisiana) Criminal Sheriff's Office's financial capacity to pay monetary damages.
- In a large class action case involving illegal strip searches, Mr. Fuhrman analyzed Jefferson County, Kentucky's ability to pay a multi-million dollar settlement by raising taxes, borrowing, taking money from general funds, liquidating property holdings, and other means. He also worked on a similar matter involving Franklin County, Kentucky.
- He worked on a product liability/insurance recovery case involving household electric water heaters.
- Mr. Fuhrman served as an expert witness in a Superfund cost recovery case involving hundreds of thousands of documents that the U.S. government provided in support of its cost claim.
- Mr. Fuhrman assisted in other types of litigation with an environmental dimension, including one engagement involving alleged improper design of a wastewater treatment plant and issues related to the role that EPA construction grants would play in calculating damages. In another case, he was asked to serve as an expert witness on behalf of a paper company that sought a variance from state water pollution control regulations based on cost-effectiveness criteria.

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- For the EPA's Office of Cooperative Environmental Management, he performed work in support of the Technology Innovation and Economics Committee of the National Advisory Committee on Environmental Technology Transfer.
- For the Center for Clean Air Policy, he completed an analysis of residential energy conservation measures that might be considered in developing an acid rain strategy.
- As a consultant to the United Nations Environment Program (UNEP), Mr. Fuhrman co-authored with a former Deputy Administrator of EPA a handbook on environmental impact assessment for decision makers in developing countries. He also wrote reports on cost-benefit analysis and related techniques for environmental decision-making, and on ways to integrate environmental considerations into the development planning process.
- In an earlier study for UNEP, Mr. Fuhrman interviewed government officials in France and Yugoslavia and co-authored a report on the feasibility of developing cooperative relationships among Mediterranean nations for performance of environmental impact assessments.
- Mr. Fuhrman provided deposition testimony in nineteen cases, testified five times in federal district court, once in a state court, and twice in EPA administrative law proceedings. He has authored numerous expert reports, and has provided litigation support in many cases.
- Mr. Fuhrman was invited by the U.S. Environmental Protection Agency and the Russian Academy of Sciences to participate in the Third US-USSR Bilateral Conference on Environmental Economics held in Moscow. He presented a paper at this conference, which was held in Moscow during October 1991.
- From April 1999 until May 2003, Mr. Fuhrman served on the Board of Contributing Editors of *Environmental Compliance and Litigation Strategy*, a monthly publication that is now discontinued.

TESTIMONY

Provided testimony in December 2005 in a case styled *In the Matter of Rhee Bros., Inc.*, a civil penalty case brought under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). The case was tried before the Chief EPA Administrative Law Judge.

Provided deposition testimony in February 2005 in *Enoch Adams et al. v. Teck Cominco Alaska Incorporated*, a citizen suit brought under the Clean Water Act.

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Provided deposition testimony in November 2004 in *United States v. Allegheny Ludlum Corporation*, an environmental civil penalty case on remand from the Third Circuit Court of Appeals.

Provided testimony in August 2004 before the EPA Science Advisory Board's Illegal Competitive Advantage Economic Benefit Advisory Panel.

Provided deposition testimony in March 2004 in *Jim Stulb, Trustee, and Fountain Valley Environmental Remediation Trust v. Schlage Lock Company, et al.*, a property damages/unjust enrichment case.

Provided deposition testimony in December 2003 in *United States v. City of Los Angeles*, an environmental civil penalty case.

Provided deposition testimony in August 2003 in *State of Illinois v. IBP, inc.*, an environmental civil penalty case.

Provided trial testimony in Portland, Oregon in May 2003 in *U.S. v. New Portland Meadows, LLC*, an environmental civil penalty case involving a race track.

Provided testimony in May 2001 at a public hearing sponsored by the EPA Science Advisory Board's Environmental Economics Advisory Committee (EEAC) regarding the need for peer review of EPA's penalty calculation model by an impartial group such as the EEAC.

Provided deposition testimony in February 2001 and trial testimony in March 2001 in *U.S. v. Bay-Houston Towing Co., Inc.*, an environmental civil penalty case involving a peat harvesting operation.

Provided deposition testimony in September 1999 in *Hopkins v. Smithfield Foods, Inc.*, an environmental civil penalty case involving a pork slaughter house.

Provided deposition testimony in *State of Wisconsin v. I-K-I Manufacturing Co., Inc.* in June 1999 in an environmental civil penalty case involving a chemical plant.

Provided testimony in May 1999 before the Montgomery County, Maryland Planning Commission concerning the possible siting of an animal boarding kennel/veterinary clinic in an area zoned rural/residential. Mr. Fuhrman's testimony focused on the inadequacies of an economic impact study prepared on behalf of the proposed facility's proponents that claimed that property diminution could not be attributed to existing boarding kennels. Testified in September 1999 in the same matter before the Montgomery County Board of Appeals, which later rejected the siting of the facility by a unanimous vote.

Trial testimony on behalf of Amoco Oil Company in February 1999 in the Circuit Court of Missouri (Jackson County) in a toxic tort suit, *Slayton et al. v. Amoco Oil Company*. His testimony focused on

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“unjust enrichment.” Although the plaintiffs sought over \$500 million dollars in damages, the jury awarded the plaintiffs only \$1 million.

Provided deposition testimony on behalf of WCI Steel in January 1998 in an environmental civil penalty case.

Provided deposition and trial testimony on behalf of the defendant in *U.S. v. Smithfield Foods, Inc.*, an environmental civil penalty case, in federal district court, in July 1997.

Testimony at the U.S. Environmental Protection Agency *Public Hearing on Recovery of Economic Benefit*, Washington, DC, November 6, 1996, on behalf of the American Automobile Manufacturers Association, American Forest and Paper Association, American Iron and Steel Institute, American Petroleum Institute, Chamber of Commerce of the United States, Chemical Manufacturers Association, Corporate Environmental Enforcement Council, Edison Electric Institute, National Mining Association, Utility Solid Waste Activities Group, and Utility Water Act Group.

Deposition testimony on behalf of Amoco Oil Company in September 1996 in a toxic tort case, *City of Independence, Missouri et al. v. Amoco Oil Company*.

Trial testimony on behalf of Laidlaw Environmental Services (TOC) in August 1995 in an environmental civil penalty case, *Friends of the Earth et al. v. Laidlaw*.

Deposition and trial testimony before an EPA Administrative Law Judge on behalf of Canonic Environmental Services in 1993 in a civil penalty case, *In the Matter of Outboard Marine Corporation*.

Trial testimony on behalf of Laidlaw Environmental Services in 1993 in *Friends of the Earth et al. v. Laidlaw*, a diligent prosecution/civil penalty case.

Deposition testimony in August 1993 in a civil penalty case, *U.S. v. Dext Company of Maryland*, on behalf of Dext.

Deposition testimony on behalf of Schering Plough Corporation in a Superfund cost recovery case, *U.S. v. Maryland Sand and Gravel, et al.*, in May 1993.

Deposition testimony on behalf of the defendant in a civil penalty case, *National Resources Defense Council v. Total Petroleum, Inc.*, in May 1992.

Deposition testimony on behalf of the defendant in a civil penalty case, *Public Interest Research Group v. Witco Chemical Corporation*, in May 1992.

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Deposition testimony on behalf of the defendant in *U.S. v. Mobil Oil Corporation*, a civil penalty case, in November 1991.

Deposition testimony on behalf of the municipal governments of Woodbridge, Carteret, and Perth Amboy, New Jersey in a civil penalty case, *Township of Franklin Sewage Authority v. Middletown Utilities Authority, et al.* in 1991.

Deposition testimony on behalf of the defendants in *U.S. v. Menominee Paper Company and Bell Packaging Corporation* in April 1990.

PUBLICATIONS

"Will Massey Energy Company Suffer Severe Penalties in Clean Water Act Case?", *Daily Environment Report*, September 26, 2007; and reprinted in *Environment Reporter*, September 28, 2007.

"Comments for the EPA Public Docket on 'Enhancing Environmental Outcomes from Audit Policy Disclosures through Tailored Incentives for New Owners,'" written on behalf of The American Chemistry Council and the Corporate Environmental Enforcement Council, July 13, 2007.

"EPA's Recent 'Final Action' on the BEN Model," published in the November/December 2005 issue of *Trends*, a bimonthly publication of the American Bar Association's Section on Environment, Energy, and Resources; and reprinted in the *Virginia Environmental Compliance Report*, a publication of the law firm Williams Mullen.

"Explanation of Recent Settlement in *U.S. v. Allegheny Ludlum*" (with John Downie), published in two different Bureau of National Affairs' publications, *Daily Environment Report* and *Environment Reporter*, both on April 29, 2005.

"*U.S. v. The New Portland Meadows* Deviates from 'BEN' Methodology," *Environment Reporter*, December 19, 2003.

"Second-Highest CWA Penalty Raises Questions about Calculation Methodology," *Environmental Compliance and Litigation Strategy*, June 2002.

"Comparing the Economics of Nonconformance and Noncompliance Penalties," *Environmental Compliance and Litigation Strategy*, April 2002.

Comments on EPA's Proposed Rule on "Control of Air Pollution from New Motor Vehicle and New Motor Vehicle Engines: Proposed Non-Conformance Penalties for 2004 and Later Model Year Emission

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Standards for Heavy-Duty Diesel Engines and Heavy-Duty Diesel Vehicles,” submitted to the public docket A-2001-30 at the U.S. Environmental Protection Agency, March 18, 2002.

“Unfinished Business: Peer Review of EPA’s ‘BEN’ Penalty Calculation Model,” *Environmental Compliance and Litigation Strategy*, July 2001.

“EPA’s Penalty Calculation Model Must Be Fairly and Fully Reviewed,” *Legal Backgrounder* (a publication of the Washington Legal Foundation), May 18, 2001.

“Not Quite Right: EPA Treatment of Ability-to-Pay Issues in Superfund Cases,” *Toxics Law Reporter*, March 22, 2001; and *Environment Reporter*, April 6, 2001.

“Decision in *U.S. v. WCI Steel Inc.* Departs from U.S. EPA’s ‘BEN’ Methodology,” (with Kenneth T. Wise), *Environmental Compliance and Litigation Strategy*, February 2000.

“Comments of the Ad Hoc Group Submitted to the Public Docket on Calculation of the Economic Benefit of Noncompliance in EPA’s Civil Penalty Enforcement Cases,” (with Paul G. Wallach and Eric Andreas), September 1999. These comments were submitted on behalf of ten major trade associations.

“EPA’s Response to Comments: Calculation of Economic Benefit and ‘Wrongful Profits,’” *Environmental Compliance and Litigation Strategy*, August 1999.

“Explaining the Controversy Surrounding *U.S. vs. Smithfield Foods*” (with Patrick D. Traylor), the *William and Mary Environmental Law and Policy Review*, Spring 1999.

“An Approach to Environmental Civil Penalty Cases” (with Kenneth T. Wise and M. Alexis Maniatis), *Environmental Compliance and Litigation Strategy*, January 1999.

“Civil Penalty Cases Raise Issues for Plaintiffs and Defendants” (with Kenneth T. Wise and M. Alexis Maniatis), *Environmental Compliance and Litigation Strategy*, November 1998.

“Consideration of ‘Wrongful Profits’ in Environmental Civil Penalty Cases” (with M. Alexis Maniatis and Kenneth T. Wise), *Environment Reporter*, September 18, 1998; reprinted in the *National Environmental Enforcement Journal*, October 1998.

“Use of After-Tax Risk-Free Rate Theory in Calculating EPA Penalties: Counterpoint” (with M. Alexis Maniatis and Kenneth T. Wise), *Toxics Law Reporter*, November 19, 1997.

“The Economic Benefit of Noncompliance: A Response,” (with M. Alexis Maniatis and Kenneth T. Wise), *Toxics Law Reporter*, September 17, 1997.

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"Almost Always ABEL: How EPA Deals with Ability-to-Pay Issues in Civil Penalty Cases," *Toxics Law Reporter*, March 12, 1997.

Comments of the BEN Coalition (12 trade associations and organizations), (with Kathy D. Bailey, Esq.), submitted to the U.S. Environmental Protection Agency Public Docket on EPA's Economic Benefit Recovery Program, March 3, 1997.

"Reexamining EPA's 'Economic Benefit' Penalty Process" (with Kathy D. Bailey and James W. Conrad, Jr.), *The Environmental Corporate Counsel Report*, February 1997.

"EPA's New Computer Model for Calculating Value of Supplemental Environmental Projects" (with Thomas H. Birdsall), *California Environmental Compliance Monitor*, August 7, 1995.

"Comments on EPA's Interim Revised Supplemental Environmental Projects Policy (60 FR 24856) and Its Related Economic Methodology" (with Thomas H. Birdsall), comments submitted to EPA (Docket No. 95F-FRL-5205-5), August 4, 1995.

"A Discussion of Technical Problems with EPA's BEN Model," *The Environmental Lawyer*, February 1995.

"Avoiding the Pitfalls of EPA's Civil Penalty Assessment Procedures" (with Lawrence J. Straw, Jr.), *California Environmental Law Reporter*, September 1994.

"Improving EPA's Civil Penalty Policies—And Its Not-So-Gentle BEN Model," *Environment Reporter*, September 9, 1994.

"EPA Penalty Calculations May Contain Significant Biases," *Counsel's Advisory* (a publication of the Washington Legal Foundation), October 1, 1993.

Comments submitted to the U.S. Environmental Protection Agency on Proposed Rulemaking titled: "Recovery of Costs for CERCLA Response Actions" (with David B. Hird, Esq. and Steven L. Humphreys, Esq.), Docket No. 115 CCR; FRL-3825-4, 57 Fed. Reg. 34742 (August 6, 1992), submitted on behalf of Schering-Plough Corporation and Westinghouse Electric Corporation, November 4, 1992.

"Getting It Right: EPA's 'BEN' Model Still Needs Work," *Environment Reporter*, April 2, 1993.

"The Role of Policy Analysis and Economic Instruments in the Environmental Protection Program of the United States," November–December 1992 issue of *Economic and Mathematical Methods*, a quarterly publication of the Russian Academy of Sciences.

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"EPA Proposed Rule on Cost Recovery: Streamlining or Steamrolling?" (with David B. Hird, Esq.), *Toxics Law Reporter*, September 9, 1992.

"Comments on Jonathan D. Libber's Article on the EPA Civil Penalty Assessment Model," *National Environmental Enforcement Journal*, December 1991.

"Penalty Assessment at the Environmental Protection Agency: A View from Outside," *Environment Reporter*, October 18, 1991.

"Negotiated Settlements under the Clean Water Act: An Excursion into a Turkish Bazaar" (with George Hansen), *Water Environment and Technology*, August 1991.

"The Role of EPA's BEN Model in Establishing Civil Penalties," *Environmental Law Reporter*, May 1991, 21 ELR 10426.

14-Dec-07

Robert H. Fuhrman**Rule 26(a)(2)(B) – Disclosure of Deposition and Trial Testimony
During the Last Four Years**

Date	Court	Name of Case	Type	Deposition or Trial
December 2005	U.S. EPA Administrative Law Proceeding	<i>In the Matter of Rhee Bros., Inc.</i>	Civil Penalty	Trial
February 2005	U.S. District Court for the District of Alaska at Anchorage	<i>Enoch Adams et al. v. Teck Cominco Alaska Incorporated</i>	Civil Penalty	Deposition
November 2004	U.S. District Court for the Western District of Pennsylvania	<i>U.S. v. Allegheny Ludlum Corporation</i>	Civil Penalty	Deposition
March 2004	U.S. District Court for the District of Colorado	<i>Jim Stulb, Trustee, and Fountain Valley Environmental Remediation Trust v. Schalge Lock Company, et al.</i>	Unjust Enrichment/Property Damage	Deposition
December 2003	U.S. District Court for the Central District of California	<i>U.S. v. The City of Los Angeles</i>	Civil Penalty	Deposition